

SEQUENCE LISTING

<110> KAO CORPORATION

<120> Mutant alkali cellulase

<130> P

<150> JP P2002-124474

<151> 2002-04-25

<160> 6

<170> PatentIn Ver. 2.1

<210> 1

<211> 824

<212> PRT

<213> Bacillus sp. KSM-S237

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Asn Thr Arg Glu Asp Asn Phe Lys His Leu Leu Gly Asn Asp Asn Val

35 40 45

Lys Arg Pro Ser Glu Ala Gly Ala Leu Gln Leu Gln Glu Val Asp Gly

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Gln Met Thr Leu Val Asp Gln His Gly Glu Lys Ile Gln Leu Arg Gly
65 70 75 80
Met Ser Thr His Gly Leu Gln Trp Phe Pro Glu Ile Leu Asn Asp Asn
85 90 95
Ala Tyr Lys Ala Leu Ser Asn Asp Trp Asp Ser Asn Met Ile Arg Leu
100 105 110
Ala Met Tyr Val Gly Glu Asn Gly Tyr Ala Thr Asn Pro Glu Leu Ile
115 120 125
Lys Gln Arg Val Ile Asp Gly Ile Glu Leu Ala Ile Glu Asn Asp Met
130 135 140
Tyr Val Ile Val Asp Trp His Val His Ala Pro Gly Asp Pro Arg Asp
145 150 155 160
Pro Val Tyr Ala Gly Ala Lys Asp Phe Phe Arg Glu Ile Ala Ala Leu
165 170 175
Tyr Pro Asn Asn Pro His Ile Ile Tyr Glu Leu Ala Asn Glu Pro Ser
180 185 190
Ser Asn Asn Asn Gly Gly Ala Gly Ile Pro Asn Asn Glu Glu Gly Trp
195 200 205
Lys Ala Val Lys Glu Tyr Ala Asp Pro Ile Val Glu Met Leu Arg Lys
210 215 220
Ser Gly Asn Ala Asp Asp Asn Ile Ile Ile Val Gly Ser Pro Asn Trp
225 230 235 240
Ser Gln Arg Pro Asp Leu Ala Ala Asp Asn Pro Ile Asp Asp His His
245 250 255
Thr Met Tyr Thr Val His Phe Tyr Thr Gly Ser His Ala Ala Ser Thr
260 265 270

Glu Ser Tyr Pro Ser Glu Thr Pro Asn Ser Glu Arg Gly Asn Val Met
275 280 285
Ser Asn Thr Arg Tyr Ala Leu Glu Asn Gly Val Ala Val Phe Ala Thr
290 295 300
Glu Trp Gly Thr Ser Gln Ala Ser Gly Asp Gly Gly Pro Tyr Phe Asp
305 310 315 320
Glu Ala Asp Val Trp Ile Glu Phe Leu Asn Glu Asn Asn Ile Ser Trp
325 330 335
Ala Asn Trp Ser Leu Thr Asn Lys Asn Glu Val Ser Gly Ala Phe Thr
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Pro Phe Glu Leu Gly Lys Ser Asn Ala Thr Asn Leu Asp Pro Gly Pro
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Asp His Val Trp Ala Pro Glu Glu Leu Ser Leu Ser Gly Glu Tyr Val
370 375 380
Arg Ala Arg Ile Lys Gly Val Asn Tyr Glu Pro Ile Asp Arg Thr Lys
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Gly Val Asn Ser Asp Ser Pro Asn Lys Glu Leu Ile Ala Val Asp Asn
420 425 430
Glu Asn Asn Thr Leu Lys Val Ser Gly Leu Asp Val Ser Asn Asp Val
435 440 445
Ser Asp Gly Asn Phe Trp Ala Asn Ala Arg Leu Ser Ala Asn Gly Trp
450 455 460
Gly Lys Ser Val Asp Ile Leu Gly Ala Glu Lys Leu Thr Met Asp Val
465 470 475 480
Ile Val Asp Glu Pro Thr Thr Val Ala Ile Ala Ile Pro Gln Ser

485	490	495
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Glu Asp Phe Val Gln Gln Thr Asp Gly Lys Tyr Lys Ala Gly Leu Thr		
515	520	525
Ile Thr Gly Glu Asp Ala Pro Asn Leu Lys Asn Ile Ala Phe His Glu		
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Glu Asp Asn Asn Met Asn Asn Ile Ile Leu Phe Val Gly Thr Asp Ala		
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Val Phe Glu Asp Gly Thr Arg Gln Gly Trp Asp Trp Ala Gly Glu Ser		
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Gly Val Lys Thr Ala Leu Thr Ile Glu Glu Ala Asn Gly Ser Asn Ala		
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Thr Glu Gly Ala Met Asn Ile Asn Leu Val Phe Gln Pro Pro Thr Asn		
675	680	685
Gly Tyr Trp Val Gln Ala Pro Lys Thr Tyr Thr Ile Asn Phe Asp Glu		
690	695	700

Leu Glu Glu Ala Asn Gln Val Asn Gly Leu Tyr His Tyr Glu Val Lys
705 710 715 720

Ile Asn Val Arg Asp Ile Thr Asn Ile Gln Asp Asp Thr Leu Leu Arg
725 730 735

Asn Met Met Ile Ile Phe Ala Asp Val Glu Ser Asp Phe Ala Gly Arg
740 745 750

Val Phe Val Asp Asn Val Arg Phe Glu Gly Ala Ala Thr Thr Glu Pro
755 760 765

Val Glu Pro Glu Pro Val Asp Pro Gly Glu Glu Thr Pro Pro Val Asp
770 775 780

Glu Lys Glu Ala Lys Lys Glu Gln Lys Glu Ala Glu Lys Glu Glu Lys
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15

tta gtt tta ctt cta tct tta ttt ccg gca gct ctt gca gca gaa gga 96

Leu Val Leu Leu Leu Ser Leu Phe Pro Ala Ala Leu Ala Ala Glu Gly

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25

30

aac act cgt gaa gac aat ttt aaa cat tta tta ggt aat gac aat gtt 144

Asn Thr Arg Glu Asp Asn Phe Lys His Leu Leu Gly Asn Asp Asn Val

35

40

45

aaa cgc cct tct gag gct ggc gca tta caa tta caa gaa gtc gat gga 192

Lys Arg Pro Ser Glu Ala Gly Ala Leu Gln Leu Gln Glu Val Asp Gly

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caa atg aca tta gta gat caa cat gga gaa aaa att caa tta cgt gga 240

Gln Met Thr Leu Val Asp Gln His Gly Glu Lys Ile Gln Leu Arg Gly

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70

75

80

atg agt aca cac gga tta cag tgg ttt cct gag atc ttg aat gat aac 288

Met Ser Thr His Gly Leu Gln Trp Phe Pro Glu Ile Leu Asn Asp Asn

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95

gca tac aaa gct ctt tct aac gat tgg gat tcc aat atg att cgt ctt 336

Ala Tyr Lys Ala Leu Ser Asn Asp Trp Asp Ser Asn Met Ile Arg Leu

100 105 110
gct atg tat gta ggt gaa aat ggg tac gct aca aac cct gag tta atc 384
Ala Met Tyr Val Gly Glu Asn Gly Tyr Ala Thr Asn Pro Glu Leu Ile
115 120 125
aaa caa aga gtg att gat gga att gag tta gcg att gaa aat gac atg 432
Lys Gln Arg Val Ile Asp Gly Ile Glu Leu Ala Ile Glu Asn Asp Met
130 135 140
tat gtt att gtt gac tgg cat gtt cat gcg cca ggt gat cct aga gat 480
Tyr Val Ile Val Asp Trp His Val His Ala Pro Gly Asp Pro Arg Asp
145 150 155 160
cct gtt tat gca ggt gct aaa gat ttc ttt aga gaa att gca gct tta 528
Pro Val Tyr Ala Gly Ala Lys Asp Phe Phe Arg Glu Ile Ala Ala Leu
165 170 175
tac cct aat aat cca cac att att tat gag tta gcg aat gag ccg agt 576
Tyr Pro Asn Asn Pro His Ile Ile Tyr Glu Leu Ala Asn Glu Pro Ser
180 185 190
agt aat aat aat ggt gga gca ggg att ccg aat aac gaa gaa ggt tgg 624
Ser Asn Asn Asn Gly Gly Ala Gly Ile Pro Asn Asn Glu Glu Gly Trp
195 200 205
aaa gcg gta aaa gaa tat gct gat cca att gta gaa atg tta cgt aaa 672

Lys Ala Val Lys Glu Tyr Ala Asp Pro Ile Val Glu Met Leu Arg Lys
210 215 220

agc ggt aat gca gat gac aac att atc att gtt ggt agt cca aac tgg 720
Ser Gly Asn Ala Asp Asp Asn Ile Ile Ile Val Gly Ser Pro Asn Trp
225 230 235 240

agt cag cgt ccg gac tta gca gct gat aat cca att gat gat cac cat 768
Ser Gln Arg Pro Asp Leu Ala Ala Asp Asn Pro Ile Asp Asp His His
245 250 255

aca atg tat act gtt cac ttc tac act ggt tca cat gct gct tca act 816
Thr Met Tyr Thr Val His Phe Tyr Thr Gly Ser His Ala Ala Ser Thr
260 265 270

gaa agc tat ccg tct gaa act cct aac tct gaa aga gga aac gta atg 864
Glu Ser Tyr Pro Ser Glu Thr Pro Asn Ser Glu Arg Gly Asn Val Met
275 280 285

agt aac act cgt tat gcg tta gaa aac gga gta gcg gta ttt gca aca 912
Ser Asn Thr Arg Tyr Ala Leu Glu Asn Gly Val Ala Val Phe Ala Thr
290 295 300

gag tgg gga acg agt caa gct agt gga gac ggt ggt cct tac ttt gat 960
Glu Trp Gly Thr Ser Gln Ala Ser Gly Asp Gly Gly Pro Tyr Phe Asp
305 310 315 320

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Glu Ala Asp Val Trp Ile Glu Phe Leu Asn Glu Asn Asn Ile Ser Trp

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gct aac tgg tct tta acg aat aaa aat gaa gta tct ggt gca ttt aca 1056

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cca ttc gag tta ggt aag tct aac gca acc aat ctt gac cca ggt cca 1104

Pro Phe Glu Leu Gly Lys Ser Asn Ala Thr Asn Leu Asp Pro Gly Pro

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gat cat gtg tgg gca cca gaa gaa tta agt ctt tct gga gaa tat gta 1152

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cgt gct cgt att aaa ggt gtg aac tat gag cca atc gac cgt aca aaa 1200

Arg Ala Arg Ile Lys Gly Val Asn Tyr Glu Pro Ile Asp Arg Thr Lys

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gga gtg aat tcg gat tct cca aat aaa gaa ctt att gca gtt gat aat 1296

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gaa aac aac act ttg aaa gtt tcg gga tta gat gta agt aac gat gtt 1344

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tca gat ggc aac ttc tgg gct aat gct cgt ctt tct gcc aac ggt tgg 1392

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gga aaa agt gtt gat att tta ggt gct gag aag ctt aca atg gat gtt 1440

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att gtt gat gaa cca acg acg gta gct att gcg gcg att cca caa agt 1488

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agt aaa agt gga tgg gca aat cca gag cgt gct gtt cga gtg aac gcg 1536

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gaa gat ttt gtc cag caa acg gac ggt aag tat aaa gct gga tta aca 1584

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565	570	575	
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Gly Val Lys Thr Ala Leu Thr Ile Glu Glu Ala Asn Gly Ser Asn Ala			
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625	630	635	640
gca aca gct cca cgt tta gat ttc tgg aaa tct gac ttg gtt cgc ggt 1968			

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Glu Asn Asp Tyr Val Ala Phe Asp Phe Tyr Leu Asp Pro Val Arg Ala

660 665 670

aca gaa ggc gca atg aat atc aat tta gta ttc cag cca cct act aac 2064

Thr Glu Gly Ala Met Asn Ile Asn Leu Val Phe Gln Pro Pro Thr Asn

675 680 685

ggg tat tgg gta caa gca cca aaa acg tat acg att aac ttt gat gaa 2112

Gly Tyr Trp Val Gln Ala Pro Lys Thr Tyr Thr Ile Asn Phe Asp Glu

690 695 700

tta gag gaa gcg aat caa gta aat ggt tta tat cac tat gaa gtg aaa 2160

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725 730 735

aac atg atg atc att ttt gca gat gta gaa agt gac ttt gca ggg aga 2256

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740 745 750

gtc ttt gta gat aat gtt cgt ttt gag ggg gct gct act act gag ccg 2304

Val Phe Val Asp Asn Val Arg Phe Glu Gly Ala Ala Thr Thr Glu Pro

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760

765

gtt gaa cca gag cca gtt gat cct ggc gaa gag acg cca cct gtc gat 2352

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770

775

780

gag aag gaa gcg aaa aaa gaa caa aaa gaa gca gag aaa gaa gag aaa 2400

Glu Lys Glu Ala Lys Lys Glu Gln Lys Glu Ala Glu Lys Glu Glu Lys

785

790

795

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gaa gca gta aaa gaa gaa aag aaa gaa gct aaa gaa gaa aag aaa gca 2448

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